

Meeting abstract

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I 49 Multi slice wide band SSFP CINE for routine 3 T cardiac imaging

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Introduction

SSFP imaging has been shown to provide excellent blood-myocardium contrast and has become a standard imaging technique for cardiac imaging at 1.5 T. However, conventional SSFP does not work very robustly at 3 T because of the increased susceptibility induced off-resonance effects [1]. Consequently, imaging parameters (especially spatial resolution) need to be compromised to obtain banding artifact free images.

The gated wideband SSFP (wbSSFP) sequence, previously described here [2], has been adapted to perform multi slice cine cardiac imaging. The alternating TR scheme allows the passband to be controlled and thus does not limit the achievable spatial resolution. Results from the wbSSFP cine sequence have been compared to the conventional SSFP images with identical parameters.

Methods

Cardiac scans were performed on a Signa Excite 3 T scanner (GE Healthcare, Waukesha) with an 8-channel cardiac phased-array coil. The following imaging parameters were used: FOV = 30 cm, in-plane resolution = 1.2 × 1.2 mm (256 × 160 acquisition matrix), slice thickness = 5 mm, FA = 45°, TR = 4.3 ms for SSFP and TR/TRs = 4.3/2.2 ms for wbSSFP. Localized linear shimming and center frequency determination were used to optimize the images. Parallel imaging was used to improve the temporal resolution of the wide band SSFP scans.

Following informed consent, 3 subjects were placed in the scanner and ventricular function examination was per-

formed. Ventricular function was assessed at 5 short-axis and 3 long-axis locations (corresponding to the two-, three-, and four-chamber views). Data was collected from both conventional and wideband SSFP scans for each of the volunteers.

Results and discussion

Figure 1 contains three phases of short-axis images obtained with SSFP (upper row) and wbSSFP (lower row). Note the severe through-plane flow transient artifact

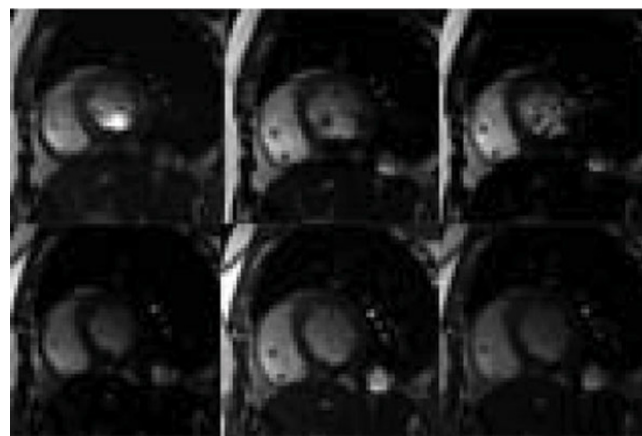


Figure 1

This shows the comparison of conventional SSFP short axis views (top row) to wideband SSFP images (bottom row). Note the prominent flow artifact seen in the conventional SSFP images.



Figure 2
Comparison of long axis views for both the scans are shown. Top row: conventional SSFP and bottom row: wideband SSFP. No flow artifacts were seen in this case.

across the short axis view for conventional SSFP images that obstructs the cardiac assessment. It is not present in the lower row images. Figure 2 shows the long axis 4-chamber view. Flow artifacts were not seen in both these cases. This may be due to signal void not falling in the blood pool area.

Conclusion

SSFP contrast is a clinically useful tool for assessing broad range of cardiac pathology. However, the sensitivity of the SSFP imaging to off resonance effects limits its use especially at higher field strength (namely 3 T). As shown in this abstract, use of alternating TR's can lead to improved robustness of the SSFP imaging at higher field, thus allowing SSFP imaging to be performed more routinely at high fields.

References

1. Schar , et al.: *MRM* 2004.
2. Lei , et al.: *ISMRM* 2006.

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